CLAIMS

1. Process for the preparation of L-3,4-dihydroxyphenylalanine, wherein L-3,4,-dihydroxyphenylalanine is produced in a fermentation medium by aerobic fermentation of a recombinant microorganism having L-tyrosine-3-hydroxy-mono-oxygenase activity and at least the metabolic pathways: glycolysis, pentose phosphate pathway, aromatic amino acid pathway, or derivative pathways thereof, wherein the process comprises
   (i) a growth phase and a production phase, wherein L-3,4-dihydroxy-phenylalanine is produced in the fermentation medium and
   (ii) a downstream processing phase,
   characterized in that L-3,4-dihydroxy-phenylalanine is produced from a carbon source and in that during at least part of the production phase and/or downstream processing phase the pH is in the range of from 1 to 7.
2. Process according to claim 1, characterized in that in the downstream processing phase the L-3,4-dihydroxy-phenylalanine produced is extracted from the fermentation medium and reextracted into a reextraction mixture.
3. Process according to claim 1 or 2, characterized in that the pH of the fermentation medium comprising L-3,4-dihydroxy-phenylalanine and/or the pH of the reextraction mixture comprising L-3,4-dihydroxy-phenylalanine is in the range of from 1 to 7 during the entire production phase of the fermentation and/or during the entire downstream processing phase.
4. Process according to any of claims 1-3, characterized in that L-3,4,-dihydroxyphenylalanine is recovered from the fermentation medium by adsorption resins with a hydrophobic interactive surface and by subsequent elution of the bound L-3,4,-dihydroxyphenylalanine from the resins with a reextraction mixture.
5. Process according to any of claims 1-4, characterized in that L-3,4-dihydroxyphenylalanine is extracted from the fermentation medium by *in situ* product recovery.
6. Process according to claim 5, characterized in that *in situ* product recovery comprises the steps of pumping the fermentation medium comprising L-3,4-dihydroxyphenylalanine and the cells of the microorganism over a filter to separate the cells from the fermentation medium, extracting L-3,4-dihydroxyphenylalanine from the fermentation medium by reactive extraction

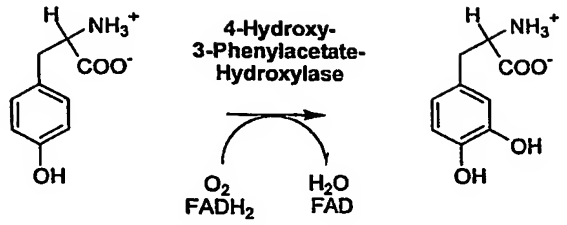
and transferring L-3,4-dihydroxyphenylalanine into the reextraction mixture b reextraction, and recycling of the cells and remaining fermentation medium t the fermentation.

7. Process according to any of claims 1-6, characterized in that the recombinan microorganism expresses, preferably overexpresses, a 4-hydroxyphenylacetate 3-hydroxylase.

8. Process according to any of claims 1-7, characterized in that the recombinar microorganism also expresses, preferably overexpresses, a gene encoding a $FADH_2$-NAD-oxidoreductase.

9. Process according to any of claims 1-8, characterized in that the carbon source is glucose.

10. Process according to any of claims 1-9, characterized in that the microorganism is *Escherichia coli* W3110/pACYC*tac* *aroF*^{FBR} *tyrA*/ pJF119EH *aroF*^{FBR} *tyrA*.



L-Tyrosine L-DOPA fig. (1)

If the microorganism used in the invention does not naturally produce L-tyrosine-3-hydroxy-mono-oxygenase activity, the microorganism can be altered such as to produce this activity, for example by cloning and expression, preferably overexpression, of a gene encoding an enzyme with 4-hydroxyphenylacetate 3-hydroxylase activity (also known as 4-hydroxyphenylacetate 3-hydroxylase) into a suitable vector into the microorganism. Examples of genes encoding L-tyrosine-3-hydroxy-mono-oxygenases are: *Phe*A encoding phenol hydroxylase from *Bacillus thermoleovorans*, *Hpa*A encoding 4-hydroxyphenylacetate 3-hydroxylase from *Klebsiella pneumonia*, *hpa*B encoding 4-hydroxyphenyalacetate 3-hydroxylase from *Escherichia coli*. Preferably, the gene encoding a 4-hydroxyphenylacetate 3-hydroxylase is the *hpa*B gene from Escherichia coli ATCC 11105.

Preferably, in the process according to the invention a microorganism is used that also expresses, and preferably overexpresses, a gene encoding a $FADH_2$-NAD-oxidoreductase. $FADH_2$-NAD-oxidoreductase enhances the activity of 4-hydroxyphenylacetate 3-hydroxylase (Xun *et al.* (200) Appl. Environ. Microbiol. vol 66: p 481-486). If the microorganism does not naturally have a gene encoding $FADH_2$-NAD-oxidoreductase or if the expression of the gene is too low, the microorganism can be altered such as to express this gene. For example, if the gene is not naturally present in the microorganism, the gene encoding $FADH_2$-NAD-oxidoreductase can be cloned in a suitable vector and introduced and subsequently expressed in the microorganism. Genes encoding $FADH_2$-NAD-oxidoreductase are for example described in Galan *et al.* (2000), J.Bacteriol. vol 182: p 627-636, for example the *hpa*C gene from *Escherichia coli* ATCC 11105B, the *fre* gene from *Escherichia coli*, the *hpa*H gene from *K.pneumoni*, the *hda*B gene from *B. pickettii* etc.

Preferably, the genes encoding a 4-hydroxyphenylacetate 3-hydroxylase and a $FADH_2$-NAD-oxidoreductase are overexpressed in the microorganism. Overexpression can be achieved by methods known to the person